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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,191	08/27/2003	Abraham B. de Waal	NVDA P000537	6452
26291 7590 06/18/2007 PATTERSON & SHERIDAN L.L.P. 595 SHREWSBURY AVE, STE 100 FIRST FLOOR SHREWSBURY, NJ 07702			EXAMINER ROCHE, TRENTON J	
			ART UNIT 2193	PAPER NUMBER
			MAIL DATE 06/18/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/650,191

Applicant(s)

DE WAAL, ABRAHAM B.

Examiner

Trenton J. Roche

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7, 10, 11 and 13-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7, 10, 11, 13-20, 22 and 24 is/are rejected.
- 7) ☒ Claim(s) 21 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This Office action is responsive to communications filed 4 April 2007.
2. Per Applicant's request, amended claims 1-5, 7, 11, 13, 14, and 17 have been entered. Claims 6, 8, 9 and 12 have been canceled. Newly added claims 21-24 have been entered.
3. Claims 1-5, 7, 10, 11 and 13-24 are currently pending and have been examined.

Claim Objections

4. Claims 23 and 24 objected to because of the following informalities: Claims 18-20 refer to their respective independent claim as "The programmed computer of claim 17/18..." whereas claims 23 and 24 simply refer to "A computer as claimed in claim 17..." It is requested that the claim be amended to refer to the independent claim in a similar fashion. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
6. Claims 2-5, 7, 10, 11 and 13-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
7. Claims 2-5, 7, 10, 11 and 13-16 recites the limitation "The method..." in line 1. There is insufficient antecedent basis for this limitation in the claim. As all of the claims ultimately depend on independent claim one, which was amended to be a computer readable medium claim, all of the dependent claims which refer, directly or indirectly, to "The method of claim 1" lack antecedent

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basis. For purposes of examination, claims 2-5, 7 and 10 will be interpreted to read "The computer readable medium of claim 1" and claims 11 and 13-16 will be interpreted to read "The computer readable medium of claim 10."

Claim Rejections - 35 USC § 101

8. In view of Applicant's amendments, the rejection of claims 1-16 under 35 U.S.C. § 101 has been withdrawn.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-5, 7, 10, 11, 15-20, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over "A Taxonomy of Obfuscating Transformations" by Collberg et al. ("Collberg"), in view of "Static Analysis of Executables to Detect Malicious Patterns" by Christodorescu et al. ("Christodorescu").

Per claim 1:

Collberg discloses:

- obtaining an algorithm instantiated in code; obtaining at least two instructions of the code that includes a sequence of instructions operating on operands stored in registers (Note

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section 6.2.1, page 11, further, all source code will include instructions which operate on operands, as source code is reduced to machine code and machine code functions by operating on operands.)

- inserting inert executable instructions between the at least two instructions obtained (Note section 6.2.1, page 11. While dead or irrelevant code may not be intended for executing, the code itself is still “executable,” as otherwise it would be illegal code and the code would not compile.)

substantially as claimed. Collberg does not explicitly disclose the instructions temporarily modifying one of the operands stored in one of the registers and another instruction restoring the operand.

Christodorescu discloses in an analogous study of obfuscation techniques the ability to have on instruction modify an operand and another instruction to restore the operand as claimed (Note section 4.1.1, “code sequences that modify the program state, only to restore it immediately.”

Further, note Figure 3, the example titled “Code obfuscated through dead-code insertion.” In here, there are two grey inserted dead-code, inserted between two instructions. The first inserted instruction, “inc eax” performs an increment action on the operand. The “dec eax” following it performs a decrement action on the operand, restoring it to its prior state. Finally, as noted in 4.1.1, these instructions, “marked by (**), do cancel out...”). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the obfuscation techniques of Christodorescu as this would create a more challenging code sequence for decompilation, as noted by Christodorescu in 4.1.1.

Per claim 2, Collberg discloses unity instructions as claimed (“boolean operations...” in section 7.1.3, page 18)

Per claim 3, Collberg discloses logic instructions as claimed (Note Figure 18)

Per claim 4, Collberg discloses branch instructions as claimed (Note Figure 10)

Per claim 5, Collberg discloses reordering one or more of the inert instructions within the code as claimed. (Note section 6.2.1, page 11. The instructions are reordered.)

Per claim 7, Collberg discloses randomly or pseudo-randomly obtaining instructions from a pool of executable instructions as claimed (Note footnotes 8 and 9, pages 31 and 32)

Per claim 8, Collberg discloses the inert instructions being instructions in the code as claimed. (“insert new (redundant or dead) code...” in section 6, page 10)

Per claims 10 and 11, Collberg discloses obtaining a seed from a pool of seeds as claimed (Note footnotes 8 and 9, pages 31 and 32. As the claim does not set forth what the seed actually is or does, the seed is interpreted as an instruction. Further, note the rejection regarding claim 7.)

Per claim 15 and 16, Collberg further discloses a threshold level as claimed (“transformation process is repeated until the required potency has been achieved...” in section 3, page 4. The potency level is the threshold level. Finally, seeds, or instructions, would be selected for each build of the code if the code were to be obfuscated.)

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Per claim 17:

Note the rejection regarding claim 1.

Per claims 18 and 19, Collberg discloses the input/output interface coupled to the memory, and the memory coupled to the central processing unit as claimed. (Note Figure 6. The components would inherently be coupled together, otherwise the system would not operate.)

Per claim 20, Collberg discloses the memory containing at least one seed used during execution of the code obfuscation program (Note footnotes 8 and 9, pages 31 and 32.)

Per claim 22, Collberg discloses dispersing the inert instructions throughout the sequence of algorithm instructions as claimed (Note the rejection regarding claim 1. Placing dead-code in the source code constitutes “dispersing” the instructions.)

Per claim 24, note the rejection regarding claim 22.

Allowable Subject Matter

11. Claims 21 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Furthermore, claims 13 and 14, while rejected under 35 U.S.C. § 112 2nd, do not have an art rejection and similarly would be allowable if rewritten in independent form including all of the limitations of the base claim, any intervening claims, and curing the deficiencies under 112 2nd.

Response to Arguments

12. Applicant's arguments with respect to claims 1-16 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trenton J. Roche whose telephone number is (571) 272-3733. The examiner can normally be reached on Monday - Friday, 9:00 am - 5:30 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Trenton J Roche
Examiner
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